Switzerland, which since 1873 had maintained stations in mountain passes, &c., has now on the Säntis (8200 ft.) in the canton of Appenzell, one of the best located and equipped summit stations in the world; and in Italy an observatory on Monte Cimone (7100 ft.) in the Apennines, near Lucca, has recently been completed.

On Ben Nevis, the highest mountain in Great Britain (4400 ft.), there is a remarkable station where during ten years an unbroken series of hourly observations has been maintained. There is a base station at sea-level, and the advantageous situation on the west coast of Scotland renders the results of the observations, which have been discussed by Dr. Buchan, of great value.

It is impossible to even enumerate all that has been gained from these high-level observations, but the chief results attained, or still sought, may be thus summarised: Determination of normal decrease of temperature and humidity with elevation; abnormal changes with elevation in cyclones (or areas of low pressure near the ground) and in anti-cyclones (or areas of high pressure near the ground); height to which these cyclones and anti-cyclones persist, and the circulation of the air around each at various levels.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

Oxford.—At the Encaenia, or Commemoration of Oxford Founders, held on June 26, the honorary degree of D.C.L. was conferred upon Sir W. H. Flower, Prof. Michael Foster, M. Edward Naville, the distinguished Swiss Egyptologist, and Sir A. W. Franks, President of the Society of Antiquaries.

Sir J. E. Gorst has succeeded Mr. Acland as Vice-President of the Council for Education.

Mr. Herbert Hancock, Mathematical and Physics master in Bancroft's School, Woodford, London, has just been appointed to the headmastership of the Hipperholme Grammar School, an important science centre for the North of England.

At a Convocation of Durham University on Tuesday, June 25, the Sub-Warden announced that the new Charter had been received by which power is given to the University to confer degrees upon women in all faculties except Divinity. Among a large number of degrees conferred was that of Bachelor of Science on Miss Ella Mary Bryant, Durham College of Science, Newcastle.

In consequence of the shortly ensuing General Election, the annual meeting of the National Association for the Promotion of Technical and Secondary Education, and the Conference of representatives of Technical Education Committees, which had been arranged to take place in London on July 11, have been postponed.

On Thursday last a very successful and numerously attended conversazione was held at University College, London. The guests were received on the grand staircase by the President (Sir John Erichsen, Bart., F.R.S.) and Deans of Faculties. The various scientific departments of the College were thrown open, and many interesting exhibits contributed to the success of the evening. Among the latter were included the spectra of argon and helium, various electrical and physical experiments, living seaweeds and marine animals, new models of dividing nuclei, &c.

The University of London has conferred the degree of Doctor of Science, without examination, on Mr. Th. Groome, Professor of Natural History at the Royal Agricultural College, Cirencester, in recognition of the merits of his original researches and published papers.

The Berlin correspondent of the *Lancet* writes as follows:—"The publication of a rumour that the authorities intend to abolish the University of Jena, has caused a stir in the scientific world, the university being one of the oldest in Germany, and having often occupied a leading position. Financial reasons are said to have induced the authorities to arrive at this decision. The constitution of the University of Jena is somewhat peculiar. It is not under the jurisdiction of a single State, but belongs jointly to four States of Thuringia, viz., Saxe-Weimar, Meiningen, Coburg, and Altenburg. The Governments of those small States entirely control the affairs of the university. If, for instance, a new professor is to be appointed they must all consent to his nomination. To put a stop to the further propagation of this rumour, the official journals of the four united Governments declare that the continued existence of this venerable university is assured both by public grants and by large donations recently made by old pupils and others. This communication has been received with general satisfaction, particularly in the town of Jena itself, which is entirely dependent upon the university."

SCIENTIFIC SERIALS.

The Mathematical Gazette, No. 5 (May 1895).—This number opens with a paper read by Dr. C. Taylor at the annual meeting of the A.I.G.T. in January last, of which the title is "The Syllabus of Geometrical Conics." In it the writer passes in review what he has done in the subject since his first contribution to the *Messenger* in 1862. Amongst other reasons for writing at this date, Dr. Taylor states: "I have, as I think, arrived at something like finality in my own view of the way in which the subject should be approached." It is on this ground that we commend the author's paper to persons interested in the teaching of geometrical conics. They will derive profit from it. The second of the mathematical worthies noticed by Mr. Heppel is John Dee, noteworthy from his contributions to Billingsley's translation of Euclid. The notes, solutions of *Gazette* questions, solutions of examination questions, and questions for solution, which are all very useful for the readers addressed, are, with the enlarged form of the journal, greatly increased in number and variety. Several recent text-books are also the subject of judicious and discriminating criticism. The *Gazette* should certainly have a successful career.

American Journal of Mathematics, vol. xvii. No. 3.—On irrational covariants of certain binary forms, by E. Study, discusses the most important covariants of binary cubics and quartics and of some other special binary forms. After paying tribute to the methods of Cayley and Clebsch, the author gives his reasons for working the whole subject over again. By means of a carefully chosen system of notation, he presents his results, as he believes, in a form that will be useful to those who have to deal with the numerous applications of the binary quantics of the lowest orders. In some detail (pp. 185–215) he examines the cubic, and the quartic and octahedron, and points out several small numerical errors in previously obtained results. The same writer contributes an article on the connection between binary quartics and elliptic functions. This is an application of the theory developed in the previous article to elliptic functions. In it he compares the relations among the rational and irrational covariants of a quartic with the identities among the four theta-functions; by this means a new light is thrown upon the familiar formulæ, and at the same time a number of new results are derived, which make the theory in question, the author states, in a certain sense *complete*. Stress is laid upon the fact that all the results are obtained by means of *actual calculations*, and that no use is made of the method of indeterminate coefficients.—Semi-combinants as concomitants of affiliants, by H. S. White, opens up a new path apparently (pp. 234–265): "I consider all ground forms that are included in the conjunctive of the system, and those of them that satisfy invariant equations of suitable order, linear in their coefficients, I designate as *affiliant* ground forms." The paper shows that not only is every semi-combinant ground form an affiliant, but also every affiliant ground form is a semi-combinant. Three short notes follow, viz.: Simplification of Gauss's third proof that every algebraic equation has a root, by M. Böcher, a note read before the American Mathematical Society (*cf.* Nature, p. 189); note sur les lignes cycloïdales, by R. de Saussure; and note on lines of curvature, by T. H. Taliaferro.

SOCIETIES AND ACADEMIES.

London

Royal Society, April 25.—"*Acokanthera Schimperi*: Natural History, Chemistry, and Pharmacology." By Prof. Thomas R. Fraser, F.R.S., and Dr. Joseph Tillie.

Specimens of the wood from which the Wa Nyika, Wa Gyriama and Wa Nyika arrow-poison is prepared have been examined by us and referred to the genus *Acokanthera*, and leaves, flowers, and fruit, each taken from the same individual tree, having also been sent to us, we have been enabled to determine that the wood of the species *Acokanthera Schimperi*, Benth. and Hook. (*Carissa Schimperi*, A.DC.), is used by the Wa Nyika and other tribes inhabiting the coast regions near Mombasa in preparing their arrow-poisons.

The arrow-poisons of these tribes usually contains a crystalline glucosidal active principle, which, in its chemical properties and pharmacological action, is identical with the active principle also separated by us from the wood of *Acokanthera Schimperi*.

The complete recognition of the species of *Acokanthera* is of primary importance, because several supplies of the wood of unidentified species of *Acokanthera* sent to us from East Equatorial Africa yielded only a glucosidal active principle which was amorphous.

The characters of the crystalline active principle which we have separated from the wood of the fully identified species, *Acokanthera Schimperi*, Benth. and Hook., agree with those of the crystalline active principle ouabaïn, separated by Arnaud from the wood of the unidentified species of *Acokanthera*, provisionally named *Ouabaïo*, obtained from North Somaliland, and also from the seeds of an unidentified species of *Strophanthus*, obtained from West Africa. As, however, the name ouabaïn is used for three quite different substances, two of which are amorphous, we would suggest that, in accordance with a usual custom, the crystalline active principle of *Acokanthera Schimperi* should be named acokantherin, and not ouabaïn.

The work accomplished by Arnott and by Haines in 1853, by Ringer in 1880, by Rochebraune and Arnaud in 1881, by Laborde in 1887, by Langlois and Varigny, by Gley and Rondeau, and by Gley in 1888, by Sailer in 1891, by Paschkis in 1892, and by Lewin in 1893, has been more fully described in this paper than in our preliminary notice of March 23, 1893.

A detailed examination of the pharmacological action of acokantherin has not led to the discovery of any important qualitative differences between its action and that of *Strophanthus hispidus* and of its active principle strophanthin, which was described by one of us in 1870, in 1872, and in 1890. As, however, a special interest must be attached to the effects upon the circulation, the experiments upon the heart, blood-vessels, and blood-pressure are described with more detail than those upon other systems.

The predominant action of acokantherin is that exerted upon striped muscle, and, because of this action, with possibly an action upon the intrinsic cardio-motor ganglia, the chief effect is produced upon the heart, while the influence exerted upon the cardio-respiratory centres in the medulla is relatively slight or secondary.

May 30.—"On the Effect of Pressure of the Surrounding Gas on the Temperature of the Crater of an Electric Arc Light. Preliminary Notes of Observations made at Daramona, Streete, Co. Westmeath." By W. E. Wilson.

Of late years it has often been assumed that the temperature of the crater forming the positive pole of the electric arc is that of the boiling of carbon. The most modern determinations give this point as about 3300°–3500° C.

Solar physicists have thought that the photosphere of the sun consists of a layer of clouds formed of particles of solid carbon. As the temperature of these clouds is certainly not below 8000° C., it seems very difficult to explain how carbon can be boiling in the arc at 3500° and yet remain in the solid form in the sun at 8000°. Pressure in the solar atmosphere seemed to be the most likely cause of this, and yet, from other physical reasons, this seemed not probable.

In order to investigate whether increased pressure in the gas surrounding an electric arc would raise the temperature of the crater, the author used a strong cast-iron box in the interior of which an electric arc light could be maintained. At the side of the box was inserted a glass lens, by which an image of the crater was formed at a distance of 80 cm. When this image was allowed to fall on the aperture of a Boys radio-micrometer, the deflections of this instrument showed any variations in the radiation from the crater. The author then describes the experiments made with this apparatus, and shows that by increasing the pressure of the gas in the box the temperature of the crater is considerably lowered intead of being raised, and he concludes that these experiments seem to show that the temperature of the crater, like that of a filament in an incandescent lamp, depends on how much it is cooled by the surrounding atmosphere, and not on its being the temperature at which the vapour of carbon has the same pressure as the surrounding atmosphere. That carbon volatilises in some form at comparatively low temperatures seems likely, from the way in which the carbon of incandescent lamp filaments is transferred to the glass. The pressure of the vapour of carbon in the arc may consequently be very small, and further it would seem that the supposition of high pressures in the solar photosphere, which has been referred to in the beginning of this paper, is not borne out by these experiments, and that carbon may exist there in the solid form at very high temperatures although the pressures are comparatively low.

June 13.—"Further Observations on the Organisation of the Fossil Plants of the Coal Measures. Part 3. *Lyginodendron* and *Heterangium*." By W. C. Williamson, F.R.S., and D. H. Scott, F.R.S.

The authors sum up their conclusions as follows:—

The vegetative organs of these genera show a remarkable combination of fern-like and cycadean characters. The leaves of *Lyginodendron*, which are now well known, are so like fern-leaves, not only in form and venation but in minute structure, that if they stood alone they would, without hesitation, be referred to Filices. Although many leaves simulate those of ferns in external characters (*Stangeria*, *Thalictrum*, &c.), none are known which at the same time show the characteristic anatomy of fern-leaves. Hence we are led to attach great weight to the characters of the *Lyginodendron* foliage. That of *Heterangium*, though less well preserved, was evidently of the same type.

In *Heterangium* the primary structure of the stem is much like that of a monostelic fern such as *Gleichenia*, but the leaf-trace bundles closely resemble the foliar bundles of a Cycad.

In *Lyginodendron* the whole structure of the *stem* suggests a Cycad, but with the remarkable peculiarity that the bundles here have the structure which in Cycadeæ is usually (though not always) limited to those of the leaf. The cycadean characters are too marked to be accidental, though the general anatomy of *Lyginodendron* is not inconsistent with a close relationship to ferns, for in *Osmunda* we have a monostelic fern, with a large pith, collateral bundles in the stem, and concentric ones in the leaf. The mere occurrence of secondary growth in a fern-like plant is not surprising, considering that it takes place in *Botrychium* and *Helminthostachys* at the present day.

In various respects *Lyginodendron* and *Heterangium* have points in common with Gleicheniaceæ, Osmundaceæ, Marattiaceæ, Ophioglosseæ, and Cycadeæ. The view of their affinities, which we suggest, is that they are derivatives of an ancient generalised race of ferns, from which they have already diverged considerably in the cycadean direction. Of the two genera, *Heterangium* appears to be geologically the more ancient, and certainly stands nearer to the filicinean stock. *Lyginodendron*, while retaining conspicuous fern-like characters, has advanced much further on cycadean lines. This view by no means involves the improbable assumption that these plants were the actual ancestors of existing Cycadeæ. How far their divergence from the fern stock had proceeded cannot be determined until we are acquainted with their organs of reproduction.

The existence of a fossil group on the border land of ferns and Cycads seems now to be well established. Count Solms-Laubach places his *Protopitys* in this position, which is probably shared by *Myeloxylon* and *Poroxylon*. Messrs. Bertrand and Renault have indeed endeavoured to derive the last-named genus from Lycopodiaceæ, and have extended the same view to *Lyginodendron* and *Heterangium*. In the latter cases their theory is completely negatived by the organisation of the leaves, and by many structural details.

The relation of the genera which we have described to those ancient gymnosperms, the *Cordaiteæ*, will form one of the most interesting palæobotanical problems of the future.

The paper is illustrated by micro-photographs and by camera-lucida drawings.

Geological Society, June 19.—Dr. Henry Woodward, F.R.S., President, in the chair.—On the occurrence of radiolaria in chalk, by W. Hill and A. J. Jukes-Browne. The authors noticed the rarity of records of Cretaceous radiolaria, and alluded to those which have been made, including those by Rüst and Sollas. They recently discovered spherical bodies resembling in form and general appearance certain calcified and partially destroyed radiolarian tests from some of the Barbadian rocks; microscopic examination of these proved that many of them, at any rate, are radiolaria. The bodies occur in the nodules of the lower beds of the Melbourn rock at Melbourn, Royston, near Hitchin, Leagrave, near Luton, Pitstone and Tring, Watlington, the Richmond boring, the lower part of the "Grit Bed" at Dover, Sutton Waldron and Burcombe (Dorset), and in a nodular chalk which may be considered as the equivalent of the Melbourn rock from Bindon Cliffs, near Axmouth, Devon. Similar organisms have recently been found in the chalk marl of Lincolnshire, Yorkshire, and Norfolk, but have not been noticed in any other parts of the chalk. It was suggested that they occurred in many portions of the chalk-ooze, but were usually rapidly and completely dissolved, and contributed to that solution of silica which furnished the substance of flint-nodules; and the authors concluded that the preservation of traces of the radiolaria in the nodules of the Melbourn rock was due to some specially favourable conditions. A description of the changes undergone by Barbadian radiolaria was given to illustrate the instability of radiolarian tests. All stages were traceable, from the perfect siliceous test to a structureless ball or disc filled with calcareous matter, or a mere patch of clear crystalline material. A description of forms recognised in the nodules of the Melbourn rock was given.—The crush-conglomerates of the Isle of Man, by G. W. Lamplugh, with an appendix by W. W. Watts. The Skiddaw slates of the Isle of Man have everywhere undergone intense shearing, and on the north-west side of the main stratigraphical axis actual disruption of the bedding with the resultant formation of breccia or crush-conglomerate on a large scale has taken place. This structure attains its widest development on the north side of the central valley, though it is noted on a more limited scale in a few localities farther south. The sections described showed the gradual smashing into fragments of highly contorted strata until every trace of the original bedding is lost, and a "crush-conglomerate" with lenticular and partly rounded inclusions is formed. The rocks described in Mr. Watts's appendix were grouped in four classes. Firstly, the grits and slates which had been crushed but had not been converted into crush-conglomerates; secondly, the crush-conglomerates themselves, and the fragments which they contain; thirdly, the dykes of decomposed dolerite (greenstone) and fresh later dolerite which penetrate the conglomerate; fourthly, a portion of the crush-conglomerate metamorphosed by these intrusions. The chief point of interest was brought out by the examination of the fragments in the conglomerate. All stages of crushing could be traced, until the grit-fragments had a structure which was a mere miniature of the crush-conglomerate itself; that is to say, if the crush-conglomerate be regarded as made of "fragments" of hard rocks enclosed in crushed "matrix" of soft rocks, a host of intermediate varieties with varying resistances will occur.—The chalky clay of the Fenland and its borders; its constitution, origin, distribution, and age, by Sir Henry H. Howorth, M.P., F.R.S. The distribution of the clay (so often termed chalky *boulder* clay) was noticed. The paucity of foreign stones was noted as compared with natives, and the similarity of the matrix of the chalky clay to the material of the older deposits of the neighbourhood. The author maintained that the contents of the clay indicate movement of material from west to east in some places, as shown by Jurassic fossils in the East Anglian chalky clay, and from east to west in others; in fact, that movement took place in sporadic lines diverging from the Wash and the Fens. He appealed to the amount of disintegration that had taken place to furnish the material for the clay, the shape of the stones in the clay, and the distribution of the clay itself, as evidence against the action of land-ice or icebergs, and maintained that there was no evidence of submergence at the time the clay was formed; and criticised the attempts made to explain the formation of the clay by water produced by the melting of ice.—On the occurrence of *Spirorbis*-limestone and thin coals in the so-called Permian rocks of Wyre Forest; with considerations as to the systematic position of the "Permians" of Salopian type, by T. Crosbee Cantrill. In South Staffordshire a thick series of red rocks—the so-called Lower Permian—overlies the ordinary yellow and grey coal measures, and underlies the Triassic rocks. They consist of sandstones, marls, calcareous conglomerates, and breccias, having a general red or purplish-red colour. Sinkings have shown that these red rocks must be regarded as of Upper Coal Measure age, because their included fossils have an Upper Coal Measure *facies*. The rocks contain bands of limestone characterised by the presence of *Spirorbis pusillus*: those parts of the series which have not yielded Coal Measure fossils being apparently similar lithologically to those which have yielded them. The evidence furnished by the deposits of the Forest of Wyre (= Enville) district also led the author to regard the red rocks associated with *Spirorbis*-limestone and coals as Upper Coal Measures, exhibiting a gradual passing away of Coal Measure conditions and the incoming of those of new red sandstone times.

Linnean Society, June 20.—Mr. C. B. Clarke, President, in the chair.—Mr. F. Enock exhibited and made some remarks upon a living specimen of an aquatic hymenopterous insect, *Polynema natans*, Lubbock.—Messrs. E. Baker and C. Reid exhibited some rare plants from the limestone hills, Co. Kerry, including *Pinguicula grandiflora*, Lam. contrasted with *P. vulgaris*, and *Saxifraga Geum* contrasted with *S. umbrosa*, with a view of determining their value as sub-species or geographical races.—Mr. Carruthers exhibited some feathers of a cuckoo taken at Whitchurch, Shropshire, on May 23 last, amongst which were some moulted feathers which were held connected with the new feathers which had replaced them by means of the barbed seed capsules of a sub-tropical grass, *Cenchrus echinatus*.—On behalf of Mr. S. Loat, there was exhibited a cuckoo's egg, taken from the nest of a hedge-sparrow, together with five white eggs of that species, an abnormality not often met with. An examination of these eggs under the microscope showed that, in regard to the texture or grain of the shell, they agreed with eggs of the hedge-sparrow, and not with those of the robin, of which white varieties are not so rare.—Mr. George West then gave the substance of a paper on some North American *Desmidieæ*, describing the characters of several new species with the aid of specially prepared lantern slides.—Mr. A. Vaughan Jennings gave a detailed account of the structure of the Isopod genus *Ourozeuktes*, upon which a most instructive criticism was offered by the Rev. J. R. Stebbing, who was present as a visitor; some further remarks being offered by Mr. W. P. Sladen.—Mr. F. N. Williams communicated the salient points in a critical paper which he had prepared, entitled "A Revision of the Genus *Silene*."—On behalf of Mr. E. R. Waite, Prof. Howes gave an abstract of a well illustrated paper on "The Egg-cases of Port Jackson Sharks," and exhibited several spirit specimens in further elucidation of the subject.—This meeting terminated the session.

PARIS.

Academy of Sciences, June 24.—M. Marey in the chair.—On the gradual extinction of an ocean-roller at great distances from its place of production: formation of equations of the problem, by M. J. Boussinesq.—New studies on the fluorescence of argon and on its combination with the elements of benzene, by M. Berthelot. With the help of M. Deslandres, the author has made a more complete spectroscopic examination of the emerald-green light produced by the fluorescence of argon under the influence of the silent electric discharge. The significance of the various rays observed or photographed is discussed. Finally, the conclusion is drawn that this fluorescence is definitely due to a condensation compound of argon; it points to the probable existence of a complex state of equilibrium in which argon, mercury, and the elements of benzene are concerned.—On the campholenic lactones, by MM. Berthelot and Rivals. The lactones have heats of formation greater than those of the isomeric acids.—On the heats of solution and neutralisation of campholenic acids, by M. Berthelot.—Reduction of silica by carbon, by M. Henri Moissan. With a current of 1000 amperes at 50 volts, the author has obtained characteristic crystals of silicon, but always mixed with carbon silicide. At the high temperature attained, carbon from the crucible reduces the silica of the charge.—Observations on a note, by MM. Barbier and Bouveault, on the products of condensation of valeric aldehyde, by M. C. Friedel.—On the integration of linear equations by the aid of definite integrals, by M. Ludwig Schlesinger.—On the determination of the ratio of the two specific heats for air, by M. G. Maneuvrier. A new method and new apparatus are described. The experimental determination of the ratio of the specific heats has yielded the following numbers:—Air, $\gamma = 1{\cdot}3924$; carbon dioxide, $\gamma = 1{\cdot}298$; hydrogen, $\gamma = 1{\cdot}384$ under the ordinary conditions of temperature and pressure.—On the propagation of sound in a cylindrical tube, by MM. J. Violle and Th. Vautier. An account of the conduction of musical sounds over long distances by pipes of wide diameter.—On the refraction and dispersion of ultra-violet radiations in some crystallised substances, by M. G. Adolphe Borel.—On the variations of "écrouissage" of metals, by M. Faurie.—On punching, by M. Ch. Fremont. An experimental inquiry into the conditions affecting the amount of play necessary between a punch and its bed. The results lead to the conclusions: (1) That the maximum effort in punching metals is independent of the clearance space in the ordinary practical conditions; (2) that the clearance space or play is a function of the thickness of the metal to be punched, and not of the diameter of the punch; (3) that it is also a function of the elongation of the metal, but in a less proportion; (4) that the play allowed ought to be about a fifth of the thickness of the metal punched. A figure is given illustrating the form of punch best adapted for piercing perfect holes.—Properties of solid carbonic acid, by MM. P. Villard and R. Jarry. Carbon dioxide solidifies and melts under a pressure of 5·1 atmospheres at −56°·7 C. In free air, the solid has the temperature −79°; ether does not lower this temperature, as has been hitherto supposed, but methyl chloride and solid carbon dioxide produce a temperature of −85° C. At a pressure of 5 mm. the solid has reached a temperature of −125°.—On M. Guye's hypothesis, by M. A. Colson.—On the alcohols derived from a dextro-rotatory turpentine, eucalyptene, by MM. G. Bouchardat and Tardy.—Condensation of the unsaturated alcohols of the fatty series with dimethylketone.—Synthesis of aromatic hydrocarbons, by MM. Ph. Barbier and L. Bouveault.—Double compounds of the fatty and aromatic nitriles with aluminium chloride, by M. G. Perrier.—Action of the air on raisin must, by M. V. Martinand.—On the preservation of wheat, by M. Balland.—On the sexual dimorphism of the Nautilus, by M. A. Vayssière.—On the variations of apparent clearness with the distance, and on a law of these variations as a function of the luminous intensity, by M. Charles Henry.—Seismic observations made at Grenoble, by M. Kilian.—On the dissolved gases at the bottom of Lake Geneva, by MM. André Delebecque and Alexander Le Royer.—The effects of the synodic and anomalistic revolutions of the moon upon the distribution of pressures in the season of winter, by M. A. Poincaré.—On the subject of the treatment of the bites of venomous serpents by chloride of lime and by antitoxic serum, by M. A. Calmette.

AMSTERDAM.

Royal Academy of Sciences, May 25.—Prof. Van de Sande-Bakhuyzen in the chair.—Prof. J. C. Kapteyn showed how the following three laws may be deduced from observations: (1) the law according to which the linear velocities of the stars are distributed; (2) the law according to which the number of stars per unit of volume varies with the distance from the sun; (3) the law according to which the absolute stellar magnitudes (magnitude at unit of distance) are distributed. The hypotheses on which the author's conclusions were based were as follows: (*a*) the real movements of every degree of magnitude of the stars in space are equally numerous in every direction; (*b*) the law of the distribution of stellar velocities does not vary with the distance from the sun; (*c*) the function representing this law has but a single maximum.—Prof. Engelmann treated of reciprocal and irreciprocal conductivity of muscles, with special relation to the theory of the heart.—Prof. Van der Waals treated of the relation between the critical temperature and the critical pressure for a mixture (tacnodal curve).—Prof. H. Behrens described some cases of artificial dichroism. Strong dichroism were observed on flax and hemp fibres after having been dyed with congo-red or benzo-azurine. A similar result was obtained with the majority of the tetrazo-dyestuffs used for dying cotton; whereas, by the application of naphthol orange, croceine scarlet, and other similar dyestuffs, no dichroism was developed. Only three basic dyestuffs were found to be capable of making flax dichroic. Among other fibres the straw fibre comes next to flax and hemp; the cotton and the wood fibres stand lower in the scale; silk requires to be dyed a deep blue with an acidulated solution of benzo-azurine, and on wool the phenomenon of artificial dichroism has not been produced by any of the colouring matters named above. Flax and hemp are strongly polarising, and can be rendered strongly dichroic, while in cotton these two qualities are found in a smaller degree; but silk, ranging above straw in polarisation, falls far below cotton as to artificial dichroism. The phenomenon seems to be of a complex nature, not explained by assuming a combination of ordinary absorption with ordinary double refraction.—Prof. Van der Waals presented a paper by Prof. W. H. Julius, entitled "On an arrangement for protecting measuring instruments from the ordinary vibrations of the ground."—Prof. Kamerlingh Onnes presented, (1) on behalf of Prof. W. Einthoven, an isolation arrangement against vibrations of contiguous bodies; (2) on behalf of Dr. J. P. Kuenen, the influence of gravitation upon the critical phenomena of simple substances and mixtures.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—A Manual of Botany: Prof. J. R. Green. Vol. 1. Morphology and Anatomy (Churchill).—Architecture for General Readers: H. H. Statham (Chapman).—The Manufacture of Explosives, 2 Vols.: O. Guttmann (Whittaker).—The Cell: Dr. O. Hertwig, translated by M. Campbell, and edited by Dr. H. J. Campbell (Sonnenschein).—Studies in the Evolution of Animals: Dr. E. Bonavia (Constable).—Electrical Laboratory Notes and Forms: Prof. J. A. Fleming (*Electrician* Company).—Ostwald's Klassiker der Exakten Wissenschaften, Nos. 60, 61, 62 (Leipzig, Engelmann).—A Manual of Book-keeping: J. Thornton (Macmillan).—Geographical Journal, Vol. v. (Stanford).

PAMPHLETS.—Il Porto di Venezia: Prof. L. Primo (Verona, Drucker).—The Genesis of California's First Constitution (1846-49): R. D. Hunt (Baltimore).—Enumeración Sistemática y Sinonimica de los Peces de las Costas Argentina y Uruguaya: Dr. C. Berg (Buenos Aires).—Origine e Diffusione della Stirpe Mediterranea: G. Sergi (Roma, Società Editrice Dante Alighieri).

SERIALS.—Journal of the Royal Microscopical Society, June (20 Hanover Square).—Chambers's Journal, July (Chambers).—Good Words, July (Isbister).—Sunday Magazine, July (Isbister).—Humanitarian, July (Hutchinson).—English Illustrated Magazine, July (198 Strand).—Zeitschrift für Physikalische Chemie, xvii. Band, 2 Heft (Leipzig, Engelmann).—National Review, July (Arnold).—Natural Science, July (Rait).—Bulletin de l'Académie Impériale des Sciences de St. Pétersbourg, March and April (St. Pétersbourg).—The Reliquary and Illustrated Archæologist, July (Bemrose).—Contemporary Review, July (Isbister).—Geographical Journal, July (Stanford).—Journal of the Royal Agricultural Society of England, Vol. 6, Part 2 (Murray).—Fortnightly Review, July (Chapman).

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